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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/800,221

03/11/2004

Peter John McElheny

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8609

7590

09/23/2004

MORGAN, LEWIS & BOCKIUS LLP  
3300 Hillview Avenue  
Palo Alto, CA 94304

EXAMINER

LINDSAY JR, WALTER LEE

ART UNIT

PAPER NUMBER

2812

DATE MAILED: 09/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/800,221	MCELHENY ET AL.	
	Examiner	Art Unit	
	Walter L. Lindsay, Jr.	2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 6 and 7 is/are rejected.
- 7) ☒ Claim(s) 5, 8 and 9 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)                | Paper No(s)/Mail Date. ____   |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date ____   | 6) <input type="checkbox"/> Other: ____                                     |

### **DETAILED ACTION**

This Office action is in response to a Divisional application filed on 3/11/2004

Currently claims 1-9 are pending.

#### ***Specification***

1. The disclosure is objected to because of the following informalities: in line 25 of page 1, "substrate 12" should be "substrate 22".

Appropriate correction is required.

2. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

#### ***Claim Objections***

3. Claims 1-9 are objected to because of the following informalities: in line 5 of claim 1, after the word "substrate" a comma should appear; in line 5 of claim 2, "portions" should be "portion"; in claim 4, line 2 "extends" should be "extend"; and in line 5 of claims 8 and 9 "part the gate" should read "part of the gate" and the period after "formed" should be removed. Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 1-4 and 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over The Applicants Admitted Prior Art (filed 3/11/2004) in view of Shirai (U.S. Patent No. 5,422,505, dated 6/6/1995).

Applicant's Admitted Prior Art shows the method substantially as claimed in Figs. 2A-2F and corresponding text as: forming a first oxide layer (110) on the substrate (155) (pg. 4, lines 33-35) (Fig. 2B); and forming a gate (120) over the substrate (pg. 4, lines 22-28) (Fig. 2A) (claim 1). The Admitted Prior Art teaches the forming of an initial oxide layer that uniformly covers an active area of the transistor (pg. 4, lines 33-35); and etching away the initial oxide layer in most of the active area, leaving a portion of the initial oxide layer in a location over which a part of the gate is formed ( pg. 7, lines 31-35) (claim 2). The Admitted prior Art teaches the step of etching away an area of the initial oxide layer to create the first oxide layer which is performed using a low voltage mask that covers a portion of the active area near where an end of the gate is formed (pg. 7, lines 31-35) (claim 3). The Admitted Prior Art teaches that the portions of the active area covered by the low voltage mask extend beyond sides of the gate (Fig. 2F)

(pg. 7, lines 31-35) (claim 4). The Admitted Prior Art teaches the formation of spacers (190, 195) adjacent the gate (Fig. 2C) (pg. 4, lines 33-35) (claim 6).

The Applicant's Admitted Prior Art lacks anticipation only in not explicitly teaching that: 1) a second oxide layer is formed on the substrate; and the first oxide layer and the second oxide layer form a composite oxide layer under the gate, the composite oxide layer being thicker near at least one end of the gate (claim 1); 2) source and drain regions of the transistor are formed by implanting dopants through the composite oxide layer, wherein the dopants are partially blocked or attenuated during the implant by the thicker composite oxide layer near an end of the gate (claim 7).

Shirai teaches the formation of a composite gate oxide layer where the ends of the gate oxide are thicker than the middle portions and, in a MOSFET device (Fig. 3) (col. 5, lines 18). The purpose of providing the composite oxide layer is to reduce an on-resistance in the transistor and to improve drive current by distributing the electric field within the composite oxide layer (col. 1, lines 27-43). Shirai describes a first gate oxide (21) (Fig 2A) being deposited on the substrate and subsequently having a portion removed (Fig 2C)(col. 3, lines 7-20). The second oxide layer (24) is formed on the substrate by dry oxidation (Fig. 2D)(col. 3, lines 21-25). Shirai also shows the formation through the composite oxide layer of As implants to form source and drain regions (11, 12) (Fig 2J-2K) (col. 3, lines 54-col. 4, lines 2).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the method of the Applicant's Admitted Prior Art, by incorporating the composite oxide layer formed and taught in Shirai, with the motivation

that the composite oxide will provide a uniform distribution of the electric field resulting, in an improved drive current and will reduce the on resistance of the transistor.

Additionally, the composite oxide will ensure the reliability of the drain side composite oxide layer, which aids in the reduction of the threshold voltage of the transistor. These goals are also compatible and in accordance with the goals of the claimed invention.

***Allowable Subject Matter***

7. Claims 5, 8 and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

8. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record, either singly or in combination fails to anticipate or render obvious, the limitations of:

...forming lightly doped drain regions of the transistor by implanting dopants through the composite oxide layer, wherein the dopants are partially blocked or attenuated during the implant by the thicker composite oxide layer near an end of the gate, as required by claim 5, as it depends from claim 1.

The prior art, either singly or in combination fails to anticipate or render obvious, the limitations of:

...the step of forming the first oxide layer comprises;

placing a mask over the substrate, the mask covering most of an active area of the transistor, leaving exposed to an oxidation ambient a portion of the active area in a location over which a part of the gate is formed; and oxidizing the substrate in the

oxidation ambient to form the first oxide layer, as required by claim 8, as it depends from claim 1.

Lastly the prior art, either singly or in combination fails to anticipate or render obvious, the limitations of:

...the step of forming the second oxide layer further comprises;

placing a mask over the substrate, the mask covering most of an active area of the transistor, leaving exposed to an oxidation ambient a portion of the active area in a location over which a part of the gate is formed; and oxidizing the substrate in the oxidation ambient to form the second oxide layer, as required by claim 9, as it depends from claim 1.

### ***Conclusion***

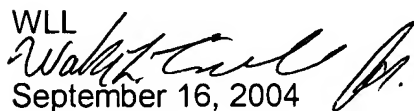
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter L. Lindsay, Jr. whose telephone number is (571) 272-1674. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John F Niebling can be reached on (571) 272-1679. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Walter L. Lindsay, Jr.  
Examiner  
Art Unit 2812

WLL  
  
September 16, 2004